

**CLAIMS**

What is claimed is:

- 1 1. A method for measuring long-term arrival rates of data  
2 samples on an asynchronous transport network, the  
3 method comprising the steps of:  
4 counting a known and predetermined number of data  
5 samples in a session;  
6 measuring a time interval between the arrival of a  
7 first data sample and the arrival of a last  
8 data sample in said session; and  
9 calculating a long-term average arrival rate of  
10 said data samples by dividing said known and  
11 predetermined number of data samples by said  
12 measured time interval of said session.
- 13 2. The method of Claim 1 wherein the data samples are  
14 contained within a plurality of data packets.
- 15 3. The method of Claim 1 wherein said session is a session  
16 with the largest number of said data samples in a set  
17 of sessions.

- 1 4. A method for synchronizing a first clock rate of a  
2 network clock to a second clock rate of a receiver  
3 clock on an asynchronous transport network, the method  
4 comprising the steps of:  
5 counting a known and predetermined number of data  
6 samples in a session;  
7 measuring a time interval between the arrival of a  
8 first data sample and the arrival of a last  
9 data sample in said session;  
10 calculating a long-term average arrival rate of  
11 said data samples by dividing said known and  
12 predetermined number of data samples by said  
13 measured time interval of said session;  
14 counting clock pulses output from said receiver  
15 clock to determine a value for said second  
16 clock rate;  
17 calculating a clock rate error variable, said  
18 variable being equal to the difference between  
19 said calculated long-term average arrival rate  
20 and said second clock rate of said receiver  
21 clock; and  
22 adjusting said second clock rate of said receiver  
23 clock by an amount equal to said clock rate  
24 error variable.
- 1 5. The method of Claim 4 wherein the data samples are  
2 contained within a plurality of data packets.
- 1 6. The method of Claim 4 wherein said session is a session  
2 with the largest number of said data samples in a set  
3 of sessions.
- 1 7. The method of Claim 4 wherein said long-term average  
2 arrival rate is an average rate of a number of  
3 different sessions.

1 8. The method of Claim 4 wherein said long-term average  
2 arrival rate is a time-weighted average of previous  
3 sessions.

1 9. The method of Claim 4 wherein the step of adjusting  
2 said second clock rate, having a frequency R, comprises  
3 dividing down said frequency R of said second clock  
4 rate by a factor Z, such that said adjusted second  
5 clock rate is  $R/Z$ .

1 10. A system for measuring long-term arrival rates of  
2 data samples on an asynchronous transport network, the  
3 system comprising:

4 means for counting a known and predetermined  
5 number of data samples in a session;

6 means for measuring a time interval between the  
7 arrival of a first data sample and the arrival  
8 of a last data sample in said session; and

9 means for calculating a long-term average arrival  
10 rate of said data samples by dividing said  
11 known and predetermined number of data samples  
12 by said measured time interval of said session.

1 11. The system of Claim 10 wherein the data samples are  
2 contained within a plurality of data packets.

1 12. The system of Claim 10 wherein said session is a  
2 session with the largest number of said data samples in  
3 a set of sessions.

1 13. A system for synchronizing a first clock rate of a  
2 network clock to a second clock rate of a receiver  
3 clock on an asynchronous transport network, the system  
4 comprising:

5 means for counting a known and predetermined  
6 number of data samples in a session;

7 means for measuring a time interval between the  
8 arrival of a first data sample and the arrival  
9 of a last data sample in said session;

10 means for calculating a long-term average arrival  
11 rate of said data samples by dividing said  
12 known and predetermined number of data samples  
13 by said measured time interval of said session;

14 means for counting clock pulses output from said  
15 receiver clock to determine a value for said  
16 second clock rate;

17 means for calculating a clock rate error variable,  
18 said variable being equal to the difference  
19 between said calculated long-term average  
20 arrival rate and said second clock rate of said  
21 receiver clock; and

22 means for adjusting said second clock rate of said  
23 receiver clock by an amount equal to said clock  
24 rate error variable.

1 14. The system of Claim 13 wherein the data samples are  
2 contained within a plurality of data packets.

1 15. The system of Claim 13 wherein said session is a  
2 session with the largest number of said data samples in  
3 a set of sessions.

1 16. The system of Claim 13 wherein said long-term average  
2 arrival rate is an average rate of a number of  
3 different sessions.

1 17. The system of Claim 13 wherein said long-term average  
2 arrival rate is a time-weighted average of previous  
3 sessions.

1 18. The system of Claim 13 wherein the step of adjusting  
2 said second clock rate, having a frequency R, comprises  
3 dividing down said frequency R of said second clock  
4 rate by a factor Z, such that said adjusted second  
5 clock rate is  $R/Z$ .

1 19. A machine-readable medium having embodied thereon a  
2 program, said program being executable by an electronic  
3 device to perform method steps for measuring and  
4 calculating long-term arrival rates of data samples on  
5 an asynchronous transport network, the method steps  
6 comprising:

7 counting a known and predetermined number of data  
8 samples in a session;

9 measuring a time interval between the arrival of a  
10 first data sample and the arrival of a last  
11 data sample in said session; and

12 calculating a long-term average arrival rate of  
13 said data samples by dividing said known and  
14 predetermined number of data samples by said  
15 measured time interval of said session.

1 20. The machine-readable medium of Claim 19 wherein the  
2 data samples are contained within a plurality of data  
3 packets.

1 21. The machine-readable medium of Claim 19 wherein said  
2 session is a session with the largest number of said  
3 data samples in a set of sessions.

1 22. A machine-readable medium having embodied thereon a  
2 program, said program being executable by an electronic  
3 device to perform method steps for synchronizing a  
4 first clock rate of a network clock to a second clock  
5 rate of a receiver clock on an asynchronous transport  
6 network, the method steps comprising:

7 counting a known and predetermined number of data  
8 samples in a session;

9 measuring a time interval between the arrival of a  
10 first data sample and the arrival of a last  
11 data sample in said session;

12 calculating a long-term average arrival rate of  
13 said data samples by dividing said known and  
14 predetermined number of data samples by said  
15 measured time interval of said session;

16 counting clock pulses output from said receiver  
17 clock to determine a value for said second  
18 clock rate;

19 calculating a clock rate error variable, said  
20 variable being equal to the difference between  
21 said calculated long-term average arrival rate  
22 and said second clock rate of said receiver  
23 clock; and

24 adjusting said second clock rate of said receiver  
25 clock by an amount equal to said clock rate  
26 error variable.

1 23. The machine-readable medium of Claim 22 wherein the  
2 data samples are contained within a plurality of data  
3 packets.

1 24. The machine-readable medium of Claim 22 wherein said  
2 session is a session with the largest number of said  
3 data samples in a set of sessions.

1 25. The machine-readable medium of Claim 22 wherein said  
2 long-term average arrival rate is an average rate of a  
3 number of different sessions.

1 26. The machine-readable medium of Claim 22 wherein said  
2 long-term average arrival rate is a time-weighted  
3 average of previous sessions.

1 27. The machine-readable medium of Claim 22 wherein the  
2 step of adjusting said second clock rate, having a  
3 frequency R, comprises dividing down said frequency R  
4 of said second clock rate by a factor Z, such that said  
5 adjusted second clock rate is  $R/Z$ .

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